Concentration and variability of the AIB amino acid in polar micrometeorites: implications for the exogenous delivery of amino acids to the primitive Earth

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Micrometeorites are extraterrestrial particles ranging in size from 25 microns to 2 mm that survive atmospheric entry and are collected on the Earth's surface. They represent the largest mass flux of extraterrestrial material to the present day Earth. Studies of large collections of micrometeorites suggest that about 20 % have not been heated to high temperatures and that they contain organic carbon. We combined a new extraction method for amino acids with a highly sensitive analytical method to detect and quantitate amino acids in micrometeorites collected at the South Pole. We found the non-protein amino acid AIB in one of our samples. Since the micrometeorite mass flux is much higher than the mass flux of carbonaceous chondrites, amino acids in these small particles would represent an important source of exogenous delivery of organic molecules and may have contributed to the origin of life on Earth.